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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JUNE 5, 1943

TECHNOLOGY DEPT.

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JUN 9 1943
DETROIT

Alcohol Into Rubber

See Page 355

A SCIENCE SERVICE PUBLICATION

Do You Know?

Natural gas for domestic purposes is obtained by farmers in southeastern Ohio by drilling 400 foot wells into underlying coal seams.

The Peruvian government has established an official register of industrial chemists to promote national cooperation in chemical industries.

A new nine-million-dollar toluene plant has been completed in California for the synthetic manufacture of the main ingredient of trinitrotoluol (TNT) from petroleum.

Flax produces versatile fiber for fine fragile laces and tough tarpaulins, fire hose, fishlines and shoes; shoe soles stitched with linen thread resist mud and mileage best.

Ferrocolumbium, used for alloying with steel to make it more weldable, is produced from imported rare-metal columbium ore, now completely allocated by the War Production Board.

Cresote for preserving cottonwood and poplar fenceposts may be applied on the farm by standing them in a metal drum half full of the coal tar product and heating about two hours at 200 degrees Fahrenheit.

Port Orford cedar, sometimes called white cedar, is not a true cedar but is a false cypress; its durability and acid-resisting properties make it suitable for use as separators in storage batteries, Venetian blinds and boats.

Question Box

Page numbers of Questions discussed in this issue:

BOTANY

How can poison ivy be identified? p. 365.

CHEMISTRY

How does moonvine juice aid in production of rubber from the castilla tree? p. 355.

How much rubber will eventually be produced annually by the new Government-owned plant? p. 355.

CHILD CARE

How can you tell whether the baby needs another sweater or blanket? p. 362.

DENTISTRY

What childhood habits may cause buck teeth? p. 360.

ENGINEERING

How can electricity be used to separate dry grain from wet? p. 361.

ENTOMOLOGY

How does pyrethrum do its deadly work on roaches? p. 357.

MEDICINE

What are the symptoms of "soldier's heart"? p. 367.

What does an excess of fat in your diet do to your blood? p. 364.

NUTRITION

What rations have been developed especially for the feeding of the hungry in Europe? p. 358.

Where does Germany get her citrus fruit? p. 361.

PHARMACY

What are the advantages of the new sulfa drug, sulfamerazine? p. 361.

Where does a fourth of all Latin America's quinine supply come from? p. 360.

PHYSICS

How far can you see from the air? p. 362.

How many 100-watt lamps could be lighted with the current in a lightning flash? p. 360.

PHYSIOLOGY

What evidence is there that an enzyme destructive of red blood cells is always present in the body? p. 356.

PSYCHIATRY

How can Germany's mental ills be cured? p. 364.

How is hypnotism now used in the treatment of the mentally ill? p. 364.

PUBLIC HEALTH

How are workers protected against health hazards in the synthetic rubber industry? p. 356.

What effect has exposure to dust on chances of getting pneumonia? p. 359.

What measure is recommended to prevent lead poisoning among shipbreakers? p. 360.

RESOURCES

Where does the Axis get sulfur? p. 366.

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

The muskrat lives primarily on roots and grasses growing in streams and lakes.

Fluid drive, similar to that of the automobile, is now used in machine tools in factories.

American olivine, a common mineral from which magnesium is recovered, has from 45% to 49% magnesia, a higher magnesium content than any other mineral except brucite.

A recent ruling of the War Production Board allows the use of only one wire staple to each copy of the SCIENCE NEWS LETTER and is effective with this issue. Please inform SCIENCE NEWS LETTER, 1719 N Street N.W., Washington 6, D. C., immediately if your copy is not received in satisfactory condition.

Phosphorescent coatings used on warships on or near valves, controls and instruments, enable men to find and use them during blackouts.

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CHEMISTRY

New Rubber Plant

Government-owned factory for making synthetic product suitable for tires and tank treads is twin plant, operated by Carbide and Carbon and U. S. Rubber.

See Front Cover

➤ **SYNTHETIC RUBBER** of the Buna S variety, good for tires all the way from jeep to super-bomber sizes, as well as for tank treads and other Army uses, will flow at the rate of 90,000 long tons a year out of a huge new plant set-up in Charleston, W. Va., which has just gone into full-scale production.

Government-owned, the new installation consists of two separate but closely integrated plants, each under the management of a well-experienced industrial organization. The first plant, where the raw materials are produced, is managed by the Carbide and Carbon Chemicals Corporation; the second, where they are converted into the final product, by the United States Rubber Company. The two plants stand side by side, so that a casual observer would think they were one; short pipe lines carry the raw materials from one to the other.

Scarcely over a year ago, there was nothing on the broad, flat plain by the Kanawha river but farm and pasture land adjoining a small airport, near the suburban station called Institute, from the presence there of a state teachers' college. Now the place is an industrial giant, capable eventually of making rubber to rim 16,000,000 civilian car wheels every year.

Buna S is the synthetic rubber made by mixing two organic compounds, butadiene and styrene. Butadiene in turn can be made from either petroleum or alcohol; at this plant alcohol is used. The alcohol is brought up the river by barge or in railroad tank cars; it comes from the great Ohio valley distilleries that have stopped making liquor to devote their entire capacities to war-alcohol production. A "tank farm" with a total storage capacity of 750,000 gallons insures a constant working supply.

Styrene, the other ingredient, is made at the Charleston plant by combining benzene and ethylene. Benzene is produced in abundance near by; it is a coke-oven by-product, and there are many coke-ovens in the valley. Ethylene is one of the lighter petroleum fractions.

Both butadiene and styrene must be

brought to a high degree of purity before they can successfully combine to produce Buna S. At this place, the Carbide and Carbon Chemicals plant brings the butadiene to 98.5% purity and the styrene to 99% before putting them into the pipe lines to go over to the United States Rubber plant.

Both chemicals are limpid, water-clear liquids as they flow into the great mixing vessels. As soon as they are well in contact, however, they combine to form a milky fluid—a true latex, filled with billions upon billions of submicroscopic rubber particles.

These are held from combining with each other because all have electrical charges of like sign. The latex is flowed into another great vat, where a salt-water solution containing a little sulfuric acid is mixed in. The salt removes the electrical charges, and the rubber particles stick together in grains or crumbs.

These are put through a mechanical shredder and washed thoroughly, to remove all chemicals that may still cling

to them. Finally the raw rubber particles are showered down into the oblong mold of a powerful press, that squeezes them into 75-pound loaves. These are packed in cartons for shipment to the tire factories.

Science News Letter, June 5, 1943

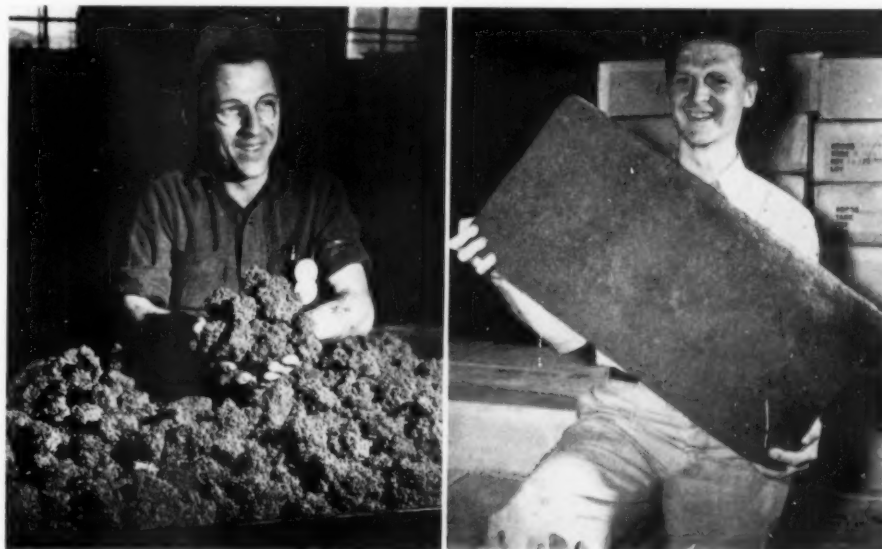
CHEMISTRY

Resin Aids Production of Rubber from Castilla Tree

➤ **RUBBER** from the castilla tree, abundant in the American tropics, may be made more easy to prepare through the use of a resin extracted from another warm-land American plant, related to the common morning-glory, known as moonvine or Nacta. Researches pointing to this possibility are reported by three Department of Agriculture scientists, S. G. Wildman, A. V. McMullan and Rosamond Griggs, who worked in the laboratories of the Bureau of Plant Industry (*Science*, May 21).

Castilla latex, although a good source of high-quality rubber, has been difficult to handle commercially because it would not respond to the chemicals used in coagulating the latex of the Hevea tree. Reports from the tropics that natives used moonvine juice to get rubber from Castilla inspired the search for a chemically controllable process based on the same plant.

Fortunately, the moonvine grows in



RUBBER—At a new buna S synthetic rubber plant in West Virginia, this rubber is being produced for use in tires and tank treads. When the Government-owned plant is in full production, enough rubber to make 63,000 tires will be produced daily. At the left is shown the rubber after removal of the electrical charges causes the particles to stick together. At the right rubber has been dried and pressed into loaves.

plenty in southern Florida as well as in the tropics, so that the three researchers could get all the fresh material they needed. A long and patient series of chemical extractions finally produced a clear, yellow, resin-like substance. This was tried on Castilla latex gathered in Mexico, and brought out the rubber quite satisfactorily, at least for small-scale laboratory conditions.

The three researchers treat their preliminary results with proper scientific caution. They say:

"These data are suggestive of the use that this resin may find in the commercial production of Castilla rubber. Since, however, absolutely fresh latex has been unavailable, we are hesitant in predicting the coagulative powers of Nacta resin under field conditions, and for this reason, we are withholding comment and interpretation of the data contained in the tables until the results of further trials on fresh latices have been ascertained."

Science News Letter, June 5, 1943

PUBLIC HEALTH

Workers' Health Guarded

Accomplishments of science in the synthetic rubber industry set a new record for protection of workers, Hygiene Association is told.

➤ AMERICAN science has achieved a new high in protection of industrial workers' health by its accomplishments in the synthetic rubber industry, F. S. Mallette of the Firestone Tire and Rubber Company, Akron, Ohio, declared at the meeting of the American Industrial Hygiene Association in Rochester, N. Y.

In striking contrast to what has happened all too often in the past when new industrial processes were developed, industrial hygienists did not wait until after the synthetic rubber industry was fully going and workers had become sick before investigating the hazards and finding ways to correct them.

"In the great biological research laboratories of the National Institute of Health, the Mellon Institute and the Dow Chemical Company, study of the physiological effects of butadiene, styrene and acrylonitrile, used in the synthesis of Buna S and N types rubber, was begun before Pearl Harbor," Mr. Mallette stated. "By the time the government plants, managed by top-ranking rubber companies, were ready to produce for America's war needs, methods had been perfected for the control of vapors incident to the synthetic process."

In his report, Mr. Mallette did not minimize the potential dangers to synthetic rubber makers, but he did describe clearly the methods and tests for protecting them fully.

Each of the three basic ingredients of synthetic rubber may cause trouble. Acrylonitrile is a cyanide, "a toxic compound comparable to a molecular equiv-

alent of hydrocyanic acid." Each of the ingredients has a characteristic odor that might warn of its presence, but, Mr. Mallette cautioned, this cannot be relied on because the sense of smell gets tired and may fail to signal danger in time.

Fortunately, the almost complete enclosure of the Buna S manufacturing process prevents exposure of the workers to all but low concentrations of the vapors, Mr. Mallette said. Butadiene is harmless apparently in all concentrations below the lower explosive limit. Low concentrations of both it and styrene can be detected by a benzol indicator. For higher concentrations, the explosimeter or combustible gas indicator are effective. Mr. Mallette advised a combustible gas alarm for permanent protection of areas such as pump houses, storage depots and the like, where vapors might accumulate.

Scientists do not believe, from their extensive animal studies, that workmen are in any danger of sickness from cumulative action of butadiene after inhaling small amounts repeatedly.

Styrene might irritate eyes, skin and breathing apparatus, but the scientists who have studied it have set a tentative permissible limit of 400 parts per million as being safe.

For acrylonitrile the permissible limit has been set at 20 parts per million. No practical method or instrument for detecting this substance in the air of workrooms is yet available, but tests of the workers' blood and urine for thiocyanate provide a useful means of checking the

degree of exposure. This biological test has been used as a guide in planning ventilation control for the protection of workers in Firestone's "Butaprene" plant. Periodic examinations have shown that these synthetic rubber ingredients have no blood damaging effect, such as that produced by benzol.

The points of potential exposure to the chemicals in the synthetic rubber manufacturing processes are in the handling of raw materials, coagulation, centrifugation and drying, Mr. Mallette stated. He concluded with the following warning:

"Adequate local and general exhaust ventilation must be provided for coagulating tanks and centrifuges. The escape of vapors from the dryers can best be prevented by maintaining a slight negative pressure within them. It may be necessary to provide hoods over the dryer outlets to control vapors of styrene and other substances driven off at this point."

Science News Letter, June 5, 1943

PHYSIOLOGY

Destroyer of Blood Cells Ever Present in Body

➤ A DESTRUCTIVE enzyme which destroys the vital red blood cells during certain diseases may be ever present in our bodies. Ordinarily an inhibitor in the tissues and blood serum holds the enzyme in check.

Evidence that this mechanism exists is reported in the British journal, *Nature* (Feb. 27), by Brian Macgrath, G. M. Findlay and N. H. Martin of the West African Force.

Certain tissues, such as the lung, liver and kidney, will destroy washed red blood cells suspended in salt solution, the scientists observed. But this action is checked by adding blood serum. Addition of a minute bit of the poisonous chemical, sodium cyanide, or heat application also inhibited blood cell destruction.

Men, monkeys and guinea pigs have been used in the experiments. So far it appears that the cell destroyer in an animal acts only on its own species, while the inhibitor will also protect the blood cells of other animals.

Discovery of this action, if substantiated, will aid those trying to combat lytic anemias, such as the mysterious blackwater fever to which the armed forces are exposed in tropical areas.

Science News Letter, June 5, 1943

ENTOMOLOGY

Makes Roaches Run

Pyrethrum is unique in effects in that it first causes violent muscular excitation, then convulsions, paralysis and perhaps death.

► A SMALL amount of pyrethrum, an insecticide used in exterminating roaches and other household insects, at first causes the German cockroach to run wildly. Experiments conducted by Dr. John M. Hutzel of Ohio State University and reported in the *Journal of Economic Entomology*, indicate that pyrethrum is unique in this effect.

Obtained from flowers similar to a daisy, pyrethrum will not harm humans or their pets, but is effective against roaches and other insects. Roaches treated with pyrethrum in either powder or liquid form first show violent muscular excitation, then convulsions, paralysis, and death or recovery, depending on the dose. The initial excitation caused by pyrethrum is of practical value because small amounts cause the roaches to desert their hiding places, and once in the open, they are easier to spray and kill.

Using the adult German roach as his "guinea pig," Dr. Hutzel employed four methods of studying the exciting effect of pyrethrum. Each method demonstrated different features of the effect, and it was found that no other insecticide tested, including those containing N-butyl

carbitol thiocyanate, rotenone, or nicotine, caused similar violent reactions.

Roaches were allowed to run over a dusted surface, and observations were made of their footprints in the dust after they had been treated with pyrethrum. This experiment showed that treated roaches ran in a crouched position and dragged their abdomens, thus increasing the amount of powder sticking to their bodies. As pyrethrum is a contact poison, this effect is important in the extermination of roaches.

Roaches were put one at a time into a treadmill wheel, and the rotation of the wheel caused by the running of the insect was recorded. The normal rate of running was three centimeters per second, but after applications of pyrethrum had been made, the rate shot up to an average maximum speed of eleven centimeters per second. Other insecticides used in this experiment produced no acceleration.

In the modified entomograph method, the roach was held stationary, but its legs were left free. As the roach attempted to move normally or in response to the treatment, the writing lever

moved up and down against a revolving kymograph drum and the action was recorded. Almost immediately after pyrethrum was applied to the abdomen of the roach, a series of sharp forward movements was recorded. The reaction to doses of the thiocyanate and nicotine was not noticeable.

In the fourth experiment a roach was fastened on its back with scotch tape, leaving only the right hind leg free to move. A human hair looped over the end of the free leg was attached to a crank lever, and the response recorded with a kymograph. The action of the free leg of untreated insects and of insects treated with the thiocyanate and nicotine contrasted sharply with the leg jerk of roaches that had received doses of pyrethrum.

Science News Letter, June 5, 1943

ENGINEERING

Tin Can Maker Converts to "Tin Fish"

► SHIFTING production from tin cans to "tin fish," American Can Company now turns out the naval torpedoes six times faster than authorities thought possible a few months ago.

Navy experts cooperating with company engineers designed precision machinery that eliminates many former hand operations, thereby telescoping manufacturing time.

The same engineering skill that devised machinery to roll 400 cans per minute off each of hundreds of automatic lines has applied mass production to a vital piece of ordnance that had been made largely by tool-shop operations.

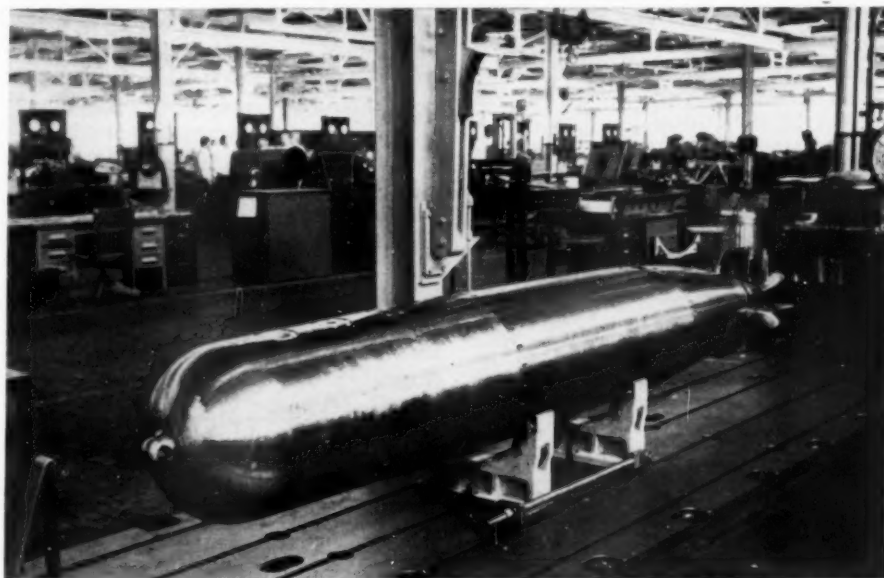
Daily torpedo output already equals the goal set by Navy contract for January, 1944. The contract calls for more torpedoes than any other in the country, each one costing about \$12,000 to produce.

Another can plant in the St. Louis area has been converted to torpedoes and is equalling the production record of the sister plant. The company now furnishes other firms with machinery and parts for getting aircraft torpedo production under way.

Before leaving the plant every torpedo receives tests for speed, horsepower and endurance; additional range tests are made by firing over a measured course.

The finished torpedo weighs about 3,000 pounds, including hundreds of pounds of explosives in its war-head.

Science News Letter, June 5, 1943



CONVERTED—This is one of the new products of a maker of tin cans. The American Can Company has converted from tin cans to tin fish and now is turning out naval torpedoes like this one at unexpected speed.

NUTRITION

Feeding the Hungry

Special rations to restore health to the starving peoples of countries now occupied by the axis are being developed for immediate use when countries are set free.

By JANE STAFFORD

▶ WHATEVER PLANS for feeding the world in the coming years of peace may be developed, the first part of the job will have to be one of feeding the people in Axis-occupied countries as the United Nations forces set them free.

Four emergency rations for this job have already been developed by scientists in the Bureau of Home Economics at the U. S. Department of Agriculture.

Planning the rations was a difficult job, even for these skilled and experienced nutritionists. First, of course, they had to consider the nourishing quality of the rations. Each must furnish sufficient calories, proteins, fats, sugar and starch foods, minerals and vitamins. Scientists know the amounts of these necessary for a good diet, but immediately there arose the problem of what might be needed by people who had been half-starved for prolonged periods. Should the ration be merely a fair subsistence one or should it be planned to make up rapidly for past deficiencies of diet? What would those deficiencies be?

The last question is part of another problem the nutritionists planning the rations had to consider, and solve if possible. The rations must be planned to feed people of any previous food tastes and habits, of any nutritional state, and in any climate, since the planners could not know when they planned the rations where they would be sent.

Transportation a Factor

Transportation, available supplies in the face of Army, Navy, Lend-Lease and civilian requirements, and packaging and keeping qualities were other considerations. In addition, the foods would have to be the kind that could be easily prepared in regions where there might be no cooking facilities left except, perhaps, a kettle of water and a fire.

The rations finally developed were devised by Miss Charlotte Chatfield, in charge of the food composition section of the Bureau of Home Economics, who

described them at a meeting of the National Research Council's committee on food habits early this year.

They are planned so that the recipients may live on them without any other food for several weeks after reoccupation of Axis-held territory. Locally available foods are expected to be added or substituted as soon as possible. The rations furnish 2,000 calories at a weight of slightly over one pound per person per day. This is slightly less in calories than the 2,400 usually recommended for adults at sedentary work, but much more than the amount peoples in occupied countries are reported to have received for some time past.

No Metal or Glass

No metal or glass containers are used except for small amounts for items included especially for infants.

Dry skimmed milk was used as the source of efficient or high-grade protein to supplement the proteins in soy and wheat, as a source of calcium and of the needed B vitamins, especially riboflavin. Brewer's yeast furnished more of this vitamin. By the time the amounts of these foods had been juggled around to make the rations, more than adequate amounts of thiamin, or vitamin B₁, had been included, what with soy beans and yeast and so on.

Getting vitamins C and A into the ration was the biggest problem, because the usual sources of these, fresh fruits and vegetables, were too bulky and perishable. Dried fruits and vegetables and the concentrates would not be available in large enough quantities in 1943. The vitamin C problem was solved by including dried viable peas or beans that could be sprouted easily in four or five days, when they would furnish this vitamin, or by using citrus fruit concentrates if possible.

Fish liver oil preparations were included to supply vitamins A and D, though there is some doubt about the availability of these rations. Vitamin D is also included in the fortified margarine.

In bread and butter terms, the rations contain the following:

Two to four ounces of a dry soup which contains brewer's yeast, dry skimmed milk, dry peas and seasoning.

Three or four ounces of a reinforced (vitamins and minerals added) cereal, already cooked.

One to five ounces of a biscuit identical with one of the two the Army uses in its K ration.

A peanut-butter-soybean spread to use on the biscuit.

Some fat that can be used either as a spread or go into the soup.

Vitamin C in the form of peas or beans to be sprouted, or in citrus fruit concentrates.

In addition, for very young children, whole milk in powdered or evaporated form and citrus concentrates or tomato juice.

A new yeast powder, with such a "slight, not unpleasant flavor" that large quantities could be eaten with relish, promises to be one of the important nutritional props for the post-war feeding problem.

The new yeast food was developed by Dr. A. C. Thaysen and his colleagues at the chemical research laboratory of the Department of Scientific and Industrial Research at Teddington, England.

New Yeast Strain

These scientists got around the one great disadvantage yeasts have as human food, their bitter taste, by developing a suitably palatable strain of an already known yeast species, *Torula utilis*. This yeast dries into light, straw-colored flakes which can be incorporated without fear of detection in bread, biscuits, soups, stews and the like.

News of this new yeast food, which has already successfully passed feeding tests on humans and animals, has just reached this country through the editorial pages of the English medical journal, the *Lancet*, and the *Monthly Science News*. (See SNL, May 29).

Back in 1919 two American pioneers in the nutrition field, Dr. T. B. Osborne and Dr. L. B. Mendel, called attention to the value of yeast as a food because of its protein value.

"The idea of the use of yeast as a source of food protein for man and the higher animals is not a new one," they

wrote in a report to the *Journal of Biological Chemistry*. "It has, however, been given renewed emphasis by the exigencies of the food situation during the war."

That paragraph, as the editor of the *Lancet* points out, might well have been written today when nutritionists are gathering forces and laying plans for feeding starving and near-starving peoples whose crops and animals have been laid waste by the present war.

The protein value of yeast, its ability to supplement or substitute for meat, was what made it seem important to nutritionists in 1919, when vitamins were in their infancy. Today we know that it is a very rich source of the B vitamins. It contains more of two of these, riboflavin and the pellagra-preventing niacin, than any other food, the editor of the *Lancet* points out. In addition, it is a good source of thiamin or vitamin B₁, popularly named the morale vitamin, and of vitamin B₆ and pantothenic acid.

Yeast's protein is important both because of the quantity available and because it is of high biological value, like the protein of meat, eggs, milk and other animal food sources.

Adding 5% of yeast to a two-pound loaf of bread would increase the nourishing value of the bread as much as would the addition of one-fourth of a pound of beefsteak or two eggs.

Yeast grows rapidly, multiplying itself eight times in as many hours, which, compared with the rate of producing other high-grade protein food, such as beef or mutton or even eggs or chickens, gives it a tremendous advantage for post-war feeding.

Yeast can be grown very economically on waste molasses, with ammonium salts added as a source of the necessary nitrogen. In the West Indies there is an almost unlimited supply of molasses for this purpose, and *Monthly Science News* reports that the first plant for the manufacture of food yeast is to be set up in Jamaica.

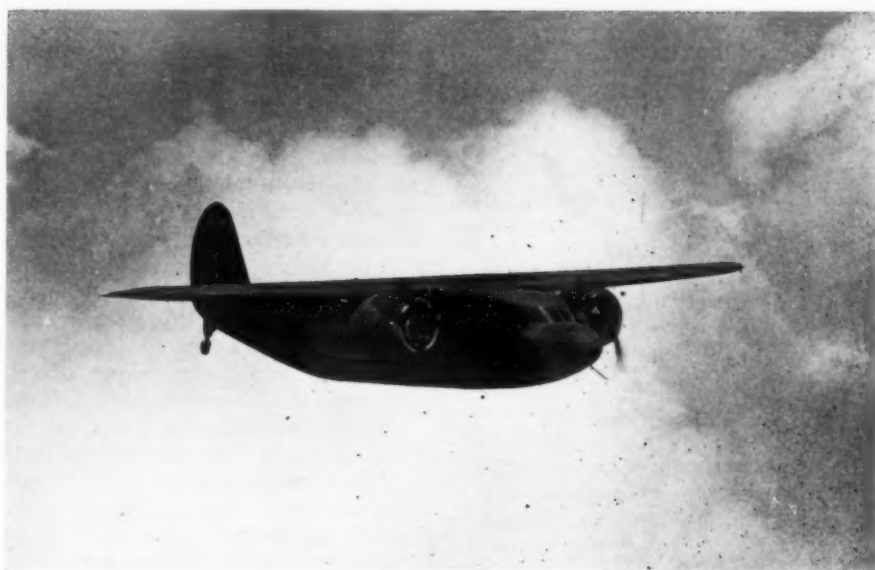
Science News Letter, June 5, 1943

● RADIO

Saturday, June 12, 1:30 p.m., EFT

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. George C. Ruhland, District of Columbia Health Officer, will discuss "Health Conditions in War-Crowded Cities."



FRONT LINE DISPATCHER—This steel tubing and plywood plane designed to take off from small fields and carry men and supplies to the actual battle areas is rapidly fabricated and simply assembled for mass production. It is the new Loadmaster, built by Cessna.

PUBLIC HEALTH

Dust Prevents Lung Ill

Contrary to what might be expected, working in dusty trade might lessen susceptibility to pneumonia, investigators find.

➤ **WORKING** at one of the dusty trades may, contrary to what might be expected, lessen rather than increase susceptibility to pneumonia.

This possibility appeared in a report by Dr. Anna M. Baetjer and Dr. Frederick J. Vintinner, of Johns Hopkins University School of Hygiene and Public Health, at the meeting of the American Industrial Hygiene Association in Rochester, N. Y.

Experiments with rats furnished the basis for this view of pneumonia susceptibility in relation to certain dusts. The scientists caution against applying the results too definitely to man until more is known.

The rats were exposed eight hours a day to high concentrations of fine quartz or feldspar dust for periods varying from one day to about five months and were then inoculated with pneumonia germs. For some rats the dust exposure was continued after inoculation with the germs. Control groups of rats were kept under similar conditions but without dust exposure and were given similar inoculations with pneumonia germs.

When the pneumonia germs were given in broth, there was not much difference between "dusted rats" and controls in the rate at which they died of pneumonia. When the germs were given in mucin, however, the mortality was consistently greater among the control rats than among those that had been exposed to the dusts. Mucin is the chief constituent of mucus.

The protective effect of the dusts against the pneumonia germs in mucin increased with the duration of exposure to the dusts. Rats which had developed pneumoconiosis, the lung condition that comes with exposure to certain dusts such as silica, were completely resistant to a dose of pneumonia germs which killed half the control rats.

The increased resistance of the "dusted rats" to the pneumonia germs in mucin, the scientists believe, was probably due to the absorption of mucin by the dust. This allowed the defense mechanisms of the body to attack the germs which apparently would otherwise be protected by the mucin.

Science News Letter, June 5, 1943

PUBLIC HEALTH

Danger of Lead Poisoning Among Shipbreakers

► SHIPBREAKERS and other workers engaged in cutting structural steel that has been covered with lead-bearing paint are in danger of getting lead poisoning, Dr. Irving R. Tabershaw, Benjamin P. W. Ruotolo and Robert P. Gleason, of the Massachusetts Division of Occupational Hygiene, warned at the meeting of the American Industrial Hygiene Association in Rochester, N. Y.

"Neither the use of respirators nor natural ventilation provides complete protection," these scientists found in study of a group of 14 men engaged in salvaging an old elevated railway structure.

Oxyacetylene cutting was used exclusively on this job. A sample of scrapings from the girders contained 7% of lead. All of the workers used approved respirators for protection against the poisonous metal fumes but during the course of the salvage operations nearly all of them were ill at one time or another with some slight or major symptoms of lead poisoning.

Rotation of workers to other jobs to avoid dangerously long exposure to lead is advised by the Massachusetts scientists.

Science News Letter, June 5, 1943

DENTISTRY

Lip-Biting Found to Be Cause of Buck Teeth

► MOST PARENTS have learned that thumb-sucking may play a role in causing buck teeth or some other variety of the condition dentists call malocclusion. Malocclusion means a condition in which the teeth are so out of place as to interfere with the efficiency of the jaws for chewing.

The lip-biting habit is also a common contributor to malocclusion while tongue habits are probably the most troublesome of all, Dr. Leland R. Johnson, of Chicago, declares (*Journal, American Dental Association*).

Tongue habits may consist in thrusting the tongue forward or to either side; forcing it between the upper front teeth, widening the space between them; or forcing it between upper and lower teeth with every swallow.

In order to break any of these habits, it is necessary that the child himself wants to break the habit. Some children may be inspired by a desire to improve their looks, others by a desire to outgrow a babyish habit, others by still other mo-

tives. You have to study your child in order to learn which chord to strike.

Once the child wants to break the habit, half the battle is won. Then various devices may be used to help him. For the tongue habits, he must be taught to swallow correctly. Dr. Johnson advises putting a small piece of candy on the palate just back of the front teeth and teaching him to hold it there with the tip of his tongue. As the candy dissolves, he keeps his tongue in this position while swallowing. After practice with the candy, the child learns to swallow always with the tongue in such position.

Pomade lipstick may help to break the lip-biting habit. The grease serves as a reminder and also relieves the chapped condition which may be the basis of the urge to bite the lips.

Science News Letter, June 5, 1943

PHYSICS

Current in Lightning Flash Overestimated in Past

► THE MAGNITUDE of the total peak current in a lightning flash has been overestimated in the past, declares R. H. Goude of the British Electrical and Allied Industries Research Association, in the British scientific journal, *Nature*.

The method universally accepted during the last decade for measuring the total current in a lightning flash was to obtain the magnitude of the various flashes from the cloud to the earth and add the recorded crest values of these currents. This method was based on the assumption that the currents in the various paths are in phase, that the current peaks occur simultaneously. The new theory advanced by Mr. Goude takes into account the phase differences between the component currents, and the total value found is necessarily less.

By the old method it was calculated that the average flash of lightning was great enough to light, during the split second that it lasts, 20,000 100-watt bulbs. Mr. Goude estimates that 15,000 of these bulbs is the more accurate number. Up until now it was thought that the most brilliant flash would be great enough to light 220,000 of these 100-watt lamps, whereas it is now believed that a mere 160,000 could be lighted.

Several investigators have recently commented on the fact that the crest values obtained on single lightning conductors are smaller than former calculations had led them to expect. The new theory provides an explanation.

Science News Letter, June 5, 1943

IN SCIENCE

CHEMISTRY

Boron Carbide Abrasive Wins Schoellkopf Medal

► DEVELOPMENT of boron carbide as an industrial abrasive has just won the 1943 Jacob F. Schoellkopf Medal for Raymond I. Ridgway, associate research director of the Norton Company, Chippewa, Ontario.

At the presentation by the Western New York Section of the American Chemical Society, Mr. Ridgway explained how war production is being substantially increased by synthetic grinding materials.

"Depletion of deposits of corundum and emery, which are naturally occurring grinding materials, makes the production of artificial alumina abrasives extremely important to our mechanized mode of warfare," he declared.

Boron carbide, the important synthetic abrasive, is next to the diamond in hardness. Sandblast nozzles, plug gauges and other products made of the abrasive last thousands of hours longer than those made of hardened steel.

Science News Letter, June 5, 1943

PHARMACY

Quinine Supply Bolstered By Guatemala Agreement

► EXPORTABLE quinine-bearing bark from the 17,000-acre cinchona plantation at El Porvenir, Guatemala, will be obtained under an agreement just announced by the Board of Economic Warfare.

A fourth of all Latin-American production is expected to come from El Porvenir. Guatemala is the only source that can supply the anti-malarial drug to this country by land route.

A laboratory already has been established at El Porvenir for testing and analyzing bark and studies are being made of the different types of trees found there.

It is hoped that a training program may also be undertaken to school people for work in locating and testing other cinchona stands in neighboring republics.

Science News Letter, June 5, 1943

NE FIELDS

ENGINEERING

Automatic Apparatus Tests Single Textile Fibers

► AN AUTOMATIC apparatus, developed at the National Bureau of Standards, tests and records photographically the strength, elasticity and extensibility of textile fibers. It is the work of Dr. Milton Harris and his associates of the Textile Foundation.

The new sensitive apparatus uses photoelectric controls. It measures the mechanical properties of individual fibers under continuous loads, and may be used to make a point-by-point record at constant rate of loading.

Important and scientific and technical advances have been made in the textile industries resulting from studies of the mechanical properties of the fibers used. This instrument promises accurate results, quickly obtained, which will prove very valuable.

Science News Letter, June 5, 1943

ENGINEERING

Dry Grain Separated from Wet by Electric Condenser

► AN INGENIOUS method of separating wet from dry grain by use of an electrical condenser has been developed in England. Two British scientists, T. A. Oxley of the Department of Scientific and Industrial Research, and F. Y. Henderson of the Imperial College of Science and Technology, have presented a method which may prove invaluable in preventing loss of grain through spoiling.

In both England and America large quantities of wheat are lost each year because of the development of fungi in the stored wheat. The fungi start in a moist, warm spot, often buried deep within the grain. They may either spread from there through the rest of the grain, or one such highly developed spot may be sufficient to taint the entire supply and make it unfit for milling.

In order to preserve the crop, it is important to eliminate these wet danger spots. To do this by thoroughly drying the entire supply would be very expensive and in many cases impractical.

The more water in the grain, the poorer is electrical conductivity of the mass. As reported in the British scientific journal, *Nature*, the two scientists have made use of this fact by passing the grain in a steady stream of uniform thickness between two metal plates acting as a condenser. If the grain is comparatively dry, it is sent down one chute. When the moisture reaches a certain percentage, the decreased electrical current causes a mechanism to divert the stream to another chute. Eventually, when the grain passing through becomes drier, it is automatically switched back to the first chute.

The moist grain is given priority in being dried. Not the entire harvest, but only the damper portions of it, need be heated enough to eliminate the few highly moist spots. With the danger spots removed, all the grain can be safely stored until needed.

Science News Letter, June 5, 1943

NUTRITION

Citrus Fruits for Germany Lost When Sicily Falls

► WHEN SICILY is lost by the Axis, Germany will lose not only its war industries' principal sulfur supply, but also the citrus fruits and citrus products needed for their scurvy-preventing vitamin C. Following the loss of citrus fruit imports from North Africa, this will be an especially heavy blow.

Germany has been the principal buyer of Italy's oranges and lemons during the past few years. The southern mainland of Italy produces both, but Sicily has been for years the heavy citrus-growing area. Its lemon-growing region was pronounced a few years ago the largest in the world. Its best lemons and oranges were shipped whole. Surpluses were processed and shipped as lemon oil, orange oil, and citrate of lime.

In 1938, Italy exported lemons valued at nearly \$16,000,000. Germany took 37% of them. It exported oranges valued at approximately \$11,000,000 of which an equal percentage was purchased for Germany.

Citrus fruits, of course, are not the only source of vitamin C. This vitamin is found in many common vegetables, but not as abundantly as in lemons and oranges. It is abundant in tomatoes. Potatoes have furnished it in sufficient quantities to persons of limited income who ate them freely in the days of potato plenty.

Science News Letter, June 5, 1943

PHARMACY

New Sulfa Drug May Simplify Treatment

► SULFAMERAZINE, a new sulfa drug which promises to simplify treatment and reduce its cost, has been developed in the medical research laboratories of Sharp and Dohme.

Details of the development and characteristics of this new drug, which chemists will call sulfamethyldiazine, are reported to medical scientists by Dr. Franklin D. Murphy, Dr. John K. Clark, Dr. Harrison F. Flippin, and Miss Elizabeth Patch in the *American Journal of the Medical Sciences* and by Dr. Arnold D. Welch, Dr. Paul A. Mattis, Albert R. Latven, Wilbur M. Benson and Ethol H. Shiels in the *Journal of the Pharmacology and Experimental Therapeutics*.

It may be given by mouth for pneumococcus pneumonia, meningitis, gonorrhea and streptococcus infections. It is said to be at least as safe as sulfadiazine and may be even safer since its slower elimination by the kidneys and greater solubility make it less likely to form stones. It is possible that patients may be adequately treated with only one, two or three daily doses of sulfamerazine as contrasted with the four to six doses frequently required when other sulfa drugs are used.

Its use as a prophylactic against germ infections as well as in treatment is "definitely indicated," it is said, because of the slow excretion of this drug.

Science News Letter, June 5, 1943

ENGINEERING

Women To Get Engineer Training in Universities

► ONE HUNDRED AND TWENTY young women with good backgrounds in college mathematics will soon begin training for employment as junior engineers in the Goodyear Aircraft Corporation plant. They will be selected and trained at the expense of the company at four leading engineering colleges.

Girls selected must be over 18 years of age and above average intelligence. They must have completed college courses in algebra and in plane and solid geometry. In the universities they will live together and take their training in classes by themselves. All expenses will be paid by the company.

Science News Letter, June 5, 1943

PHYSICS

Visible Distances Set

Pilots work out formula to tell how far you can see from various altitudes. Flyers over English Channel can see Germany.

► HOW FAR can your friend in the Air Forces see from 25,000 feet up? Pilots as well as airline passengers often wonder how far they can see from upstairs.

Distances at altitudes are even more deceiving than on the surface at sea-level. One Pan American Airways' passenger, for example, on a flight that had to climb to 20,000 feet over Brazil, insisted that she could see the coast of Africa. That the coast of Africa was 1,822 air miles from the mouth of the Amazon fazed her not one whit.

Clipper pilots, attempting to answer queries from passengers, and to justify or deny such claims of long range visibility from various heights, came across the surprising fact that practically no one knows how far you can really see. With that fact in hand, the Pan American Clipper Captains got together, went through the research files and produced the scientific answer. They call it the Clipper Captain's "vision-range" formula.

It will tell, for example, that given good visibility on a relatively cloudless day, a pilot of a Flying Fortress, cruising at 25,000 feet, can see right into Germany before he is out of sight of England's Channel coast. From Tunisia, from the same altitude, he can see a dark mass on the far horizon, which would be the middle of Sicily. The higher you go, of course, the farther you can see. By elevating yourself, you can look right over the curvature of the earth.

The actual curvature of the earth for the first mile is about nine inches, and increases thereafter at a rate approximately equal to the square of the distance in feet. If approximate curvature of the earth for any distance is wanted, multiply the square of the distance in miles by .67. The answer will tell you how much the earth has curved under at that point. For example, the surface of the earth 10 miles from where you are standing is 67 feet lower than you are.

On the surface of the sea, at eye level, the range of vision is only 2.9 miles. On land, since the earth itself varies in altitude, the range of vision is always at least the same 2.9 miles plus the distance reflected by altitude of the individual

and the object's altitude.

With that background, the Clipper Captains finally worked out the following "vision range" formula to tell how far the average person can see from various heights.

The range of vision is equal to the square root of the altitude multiplied by 1.225 miles. For example, at 1,000 feet, you can see for 38.8 miles. From 10,000 feet, you can see for 122.5 miles. And for those who are somewhat rusty on their mathematics, the Clipper Captains compiled a table:

From	1,000 feet—you can see—	39 miles
" 2,000 "	" " " "	55 "
" 3,000 "	" " " "	67 "
" 4,000 "	" " " "	77 "
" 5,000 "	" " " "	87 "
" 10,000 "	" " " "	123 "
" 15,000 "	" " " "	150 "
" 20,000 "	" " " "	173 "
" 25,000 "	" " " "	194 "

Science News Letter, June 5, 1943

CHILD CARE

Way Baby Behaves May Guide Young Mothers

► MANY a new mother would be less frightened and make fewer mistakes in caring for and bringing up her baby if she let his actions and reactions guide her. How to dress the baby is a simple example. Doctors, nurses and stores that sell infant's wear can give mother a list of suitable clothes, but she will still be faced with the problem of when to put on an extra sweater or heavier underwear to keep baby warm, and when to take off everything but his diapers to keep him comfortably cool. Long before baby can tell her in words how he feels, he can shiver if he is cold, and perspire if he is too warm. He can also cry, and will, if he is too uncomfortable for any reason. He will squirm and wriggle and try to kick as well as cry if his clothes are tight or his blankets wrapped too tightly.

Baby's actions can guide her, also, on the often difficult feeding problem. Even at a very early age babies have a way of knowing how much food they require. A healthy baby, after the first few days

of life, can be trusted to take enough milk at a feeding or nursing and not to overeat. It seems foolish to spoil the efficiency of this innate knowledge by insisting that baby take just so many ounces, no more and no less, at every feeding.

Many other ways in which mother can learn how to care for her baby from observing him and understanding how he grows are given in a book which has just come off the press, *Babies Are Human Beings*, by Dr. C. Anderson Aldrich, associate professor of pediatrics at Northwestern University Medical School, and his wife, Mary M. Aldrich (Macmillan). Since the authors have raised a family of their own, they write with real understanding of the practical as well as the medical problems involved.

Science News Letter, June 5, 1943

PUBLIC HEALTH

Industrial Hygienists Told They Are "Expendables"

► INDUSTRIAL hygienists may well regard themselves as the "expendables" in the important rear-guard action of "holding the lines against preventable disease in the population sustaining the armed forces and producing the essentials of war," Chief Sanitary Engineer John J. Bloomfield, of the states relation section of the National Institute of Health, U. S. Public Health Service, declared at the National Conference of Governmental Industrial Hygienists.

They must concentrate all their strength and resources, which are not likely to be increased although their tasks and responsibilities are ever growing, to their "first and most important duty" of reducing industrial disability in its strictest sense, Mr. Bloomfield declared.

This means hewing to the line of establishing and keeping safe and healthful conditions in the factories and work places, protecting the war workers from accidents and health dangers arising from their jobs.

"There is not a single industrial hygiene unit that can claim to have carried out this responsibility to so great a perfection," he stated, "that it can branch away from this objective and actively undertake tuberculosis control, venereal disease control or nutrition work in the plant as some are doing."

"Open the doors" to workers in these other health fields, he advocated, but "do not try to be all things to all men."

Science News Letter, June 5, 1943

A new world of MICROSCOPY...

The RCA Electron Microscope has been in commercial use for over a year. Nearly fifty of these instruments have been purchased by industrial companies, the government, and scientific institutions, and are proving their practical value.

Because of their extraordinary resolving power they have opened a new world of marvelous detail to the laboratory technicians who are using them.

A striking example of this advantage is shown by comparison of the two photographs reproduced here. Photograph A shows a colony of typhoid germs magnified 540 diameters.

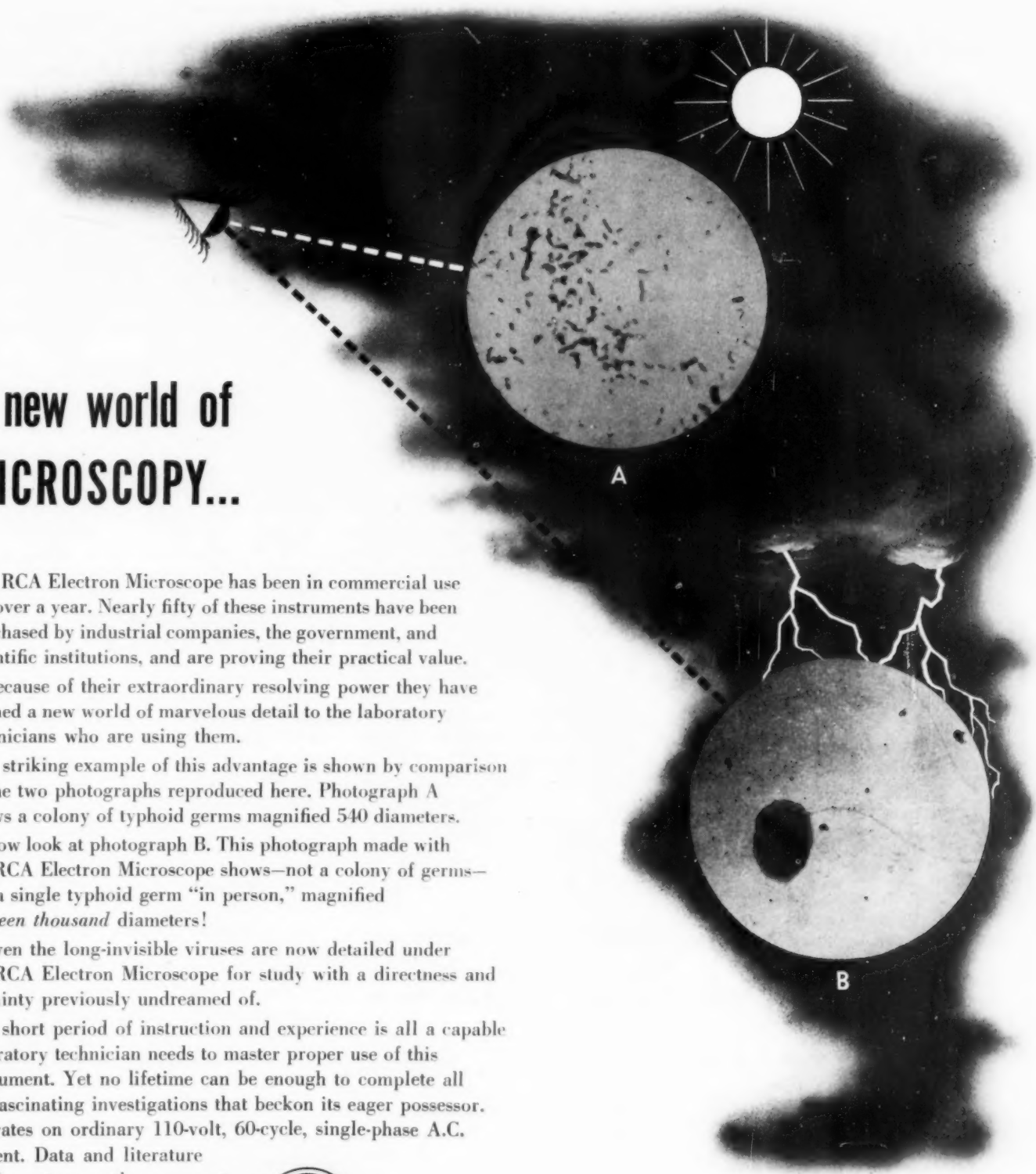
Now look at photograph B. This photograph made with the RCA Electron Microscope shows—not a colony of germs—but a single typhoid germ “in person,” magnified *thirteen thousand* diameters!

Even the long-invisible viruses are now detailed under the RCA Electron Microscope for study with a directness and certainty previously undreamed of.

A short period of instruction and experience is all a capable laboratory technician needs to master proper use of this instrument. Yet no lifetime can be enough to complete all the fascinating investigations that beckon its eager possessor. Operates on ordinary 110-volt, 60-cycle, single-phase A.C. current. Data and literature will be sent promptly on request. RCA Victor Division, Radio Corporation of America, Camden, N. J.



RCA ELECTRON MICROSCOPE



PSYCHIATRY

Germany is Curable

Psychiatrist prescribes proper treatment of the paranoid condition that he says has affected Germany for at least five generations.

► **RX FOR permanent world peace:** Recognize and treat the paranoid condition from which Germany has suffered for at least five generations.

That prescription by Dr. Richard M. Brickner, neuropsychiatrist and assistant professor at the College of Physicians and Surgeons, Columbia University, is presented in non-technical terms in his book, just off the press, *Is Germany Incurable?* (Lippincott).

The answer to the question is no. The individual paranoid patient can be cured and, Dr. Brickner believes, so can a nation.

First step is to make the diagnosis. The world at large must learn to recognize that Germany's troubles are not merely matters of economic disadvantages, population pressures, "encirclement" or all the other conditions of which Germans have complained in martyred tones since before the first World War. The Atlantic Charter will fail, as the Versailles Treaty failed, if it is left to be the sole basis for post-war planning, without taking into account the paranoid behavior of the German people for generations.

Second step is treatment. For the paranoid patient this starts with the "clear area" in his distorted personality, the part that is not completely taken up with ideas of his own importance, his need to prove his superiority and to protect himself, by murder if necessary, from the jealous plottings of those around him. In Germany this clear area, Dr. Brickner believes, can still be found

in those people who have not entirely succumbed to the paranoid trend, "catching" as it is.

Such people must be found, encouraged in their non-paranoid ways, and put in charge of all institutions in Germany, from schools to street-cleaning, so as to prevent these from being used to keep the paranoid trend going, as they were during the Weimar Republic.

The Atlantic Charter helps here by assuring that the population will learn to associate tangible rewards, such as food and jobs, with non-paranoid behavior.

Treating a paranoid patient is a long, hard job, as any psychiatrist can testify. Treating a paranoid nation or population group will be equally long and hard, but must be undertaken by the rest of the world for its own preservation.

"If the adherents of democracy can be persuaded of their appalling peril," writes Dr. Brickner, "much can be done to avert it. But this time we shall have to remove blinders and rose-colored spectacles and consign them to the scrap-heap for good.

"We must learn once and for all that in dealing with paranoid behavior, isolationism exists only in fancy—once a paranoid has seen you, your isolation is over."

Science News Letter, June 5, 1943

PSYCHIATRY

Hypnotism Again Used In Treatment of Mentally Ill

► **HOPEFUL RESULTS** from new use of an old tool for treating mentally sick persons were reported by Dr. Merton M. Gill and Dr. Margaret Brenman of the Menninger Clinic, Topeka, Kans., at the meeting of the American Psychiatric Association in Detroit.

The tool is hypnotism, but its new use is far different from the common idea of a Svengali using hypnotism to subdue and control another person. When the doctors use hypnotism the patient knows he will not be forced to submit but can move around freely, pound the table and talk back if he feels like it; also there

will be no danger of his forgetting what he said while the doctor remembers it. Hypnotism is being tried, the doctors explained, because for some reason not yet understood a person while hypnotized can remember not only forgotten events but forgotten ideas and attitudes. These ideas and attitudes may be the reasons for his fears and difficulties, and the peculiar behavior which make other people label him crazy or mentally sick. Once he realizes why he is acting the strange way he does, he may be able to reorganize his ideas and attitudes, both conscious and unconscious, to fit the pattern of life demanded by modern society.

The Topeka doctors have used hypnosis in a number of patients with apparently good results but state that it is too soon after the treatment to be sure of its final value. They do believe, however, that their results justify further study of the method, particularly as it achieves results fairly rapidly compared to other methods.

Science News Letter, June 5, 1943

MEDICINE

Too Much Fat in Diet Injures Red Blood Cells

► **COMES** the post-war day when you can once more get all the thick whipping cream you want, your doctor may be advising you to go slow on it to avoid anemia.

Drinking one pint of 32% cream causes human blood serum to become injurious to the red cells of the blood, making them more fragile and more easily destroyed. This discovery and its implications are announced by Prof. Victor Johnson, Dr. Joan Longini and Dr. L. Willard Freeman of the University of Chicago (*Science*, April 30).

The extra blood destruction resulting from taking a lot of fat or cream seems to be insufficient, the scientists state, to produce anemia in normal persons whose bone marrow is capable of replacing the extra red blood cell losses. It remains to be determined, however, whether: 1. Building new red cells after blood loss through hemorrhage, when the bone marrow blood cell factory is excessively taxed, might be hastened by a low fat diet or retarded by a high fat diet. 2. Abnormalities in fat absorption or abnormal sensitivity of the cells to the injurious substance might help produce certain anemias not associated with hemorrhage or blood loss.

Science News Letter, June 5, 1943

★★★★★★★★★★★★★★

WYOMING

Yes, even THIS summer you may fish in its mountain streams, ride horseback through its hills and canyons, find Indian relics and marine fossils in a region of great historical and geologic interest.

The Patons welcome a limited number of guests at their ranch in the Big Horn country. They offer plenty of ranch grown food, comfortable cabins and gentle horses. May they tell you more? Write:

Paton Ranch, Shell, Wyoming

BOTANY
**NATURE
RAMBLINGS**
by Frank Thone



The Unholy Trinity

► ST. PATRICK, tradition tells, explaining the doctrine of the Trinity to the puzzled Irish chieftain, plucked the first trifoliate leaf his eye lighted on, to show how the same being could be three and yet one.

Had the great missionary been laboring among American Indians instead of among the Irish, he might a little later have had cause to wonder over blistered, itching fingers, whether his illustration had been well chosen. For one of the most common trifoliate-leaved plants in North America is poison ivy, which (as any of its victims will tell you) is decidedly more satanic than divine in its connotations.

That trifoliate structure of the leaf is the one constant feature of poison ivy, by which it can be recognized—and shunned—wherever it grows. Everything else about the plant is variable: it may be a tall shrub, up to your shoulders, or it may be a growth no more than shoe-top high. Again, it may be a slender vine clinging to tree trunks and stone fences with myriads of aerial roots, or (in Florida hammocks) a veritable tropical liana with a trunk as thick as your leg.

There is certainly no constancy to the outline of the leaflets themselves, either in the poison ivy proper of the Eastern states or in its cousin, the poison oak of the Far West. There may be a few coarse notches or teeth, or deeper, wavy lobes, or the margins may be completely smooth and unbroken. The leaflets themselves are usually ovate in general shape, but they may be so broad as to be almost round or narrow enough to be called oblong. And just to make it more interesting, you can often find several markedly different shapes of leaves on the same plant!

The same plant, too, may be shrub and vine at the same time. This paradox is attained through the habit of the main stem, which runs along barely under the soil surface, sending up shrubby branches at close intervals, so that what may appear to be a clump or row of poison-ivy shrubs is very likely to be simply the branches of one vine-like underground stem or rootstock. Then, without warning, the same horizontal stem may suddenly turn vertically upward, climbing the trunk of a tree and becoming a perfectly orthodox vine.

Latest methods of preventing and treating poison ivy have been summarized from medical reports in a bulletin just compiled by Science Service. The bulletin gives formulas for two protective ointments for use by those who expect to be exposed to poison ivy. In addition it tells about a new method which doctors treating ivy poisoning may wish to try. The bulletin will be sent for two three-cent stamps accompanying requests addressed to Science Service, 1719 N St., N. W., Washington 6, D. C. *Science News Letter, June 5, 1943*



Nine Young Men with "Eyes" Second to None



To the enemy command the star-marked bomber these nine young men will fly is a many-eyed creature of destruction. Its "eyes" of optical glass, fixed on the stars or sun, lead it straight to its objective. Then other optical "eyes" look down and on upon ton of American-made TNT blossoms red in the dust of a shattered Axis dream. Still other "eyes" make the photographic record of its accomplishments to give lie to claims of "only slight damage" . . . to chart a path for others to follow.

Without the bomber's many-lensed "eyes"—what they all are and what they do is a military secret—without the instruments such as Bausch & Lomb produces, the powerful offensive blows of America's mighty bombing fleet would be impossible.

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RESOURCES

Axis Sulfur from Italy

Two-thirds of supply essential in war production is produced in Sicily. Rest will be lost when northeastern part of Italian peninsula is taken by Allies.

► TWO-THIRDS of the all-important supply of sulfur for the Axis will be lost when Sicily is taken. The rest will be lost when the sulfur mines in the northeastern part of the Italian peninsula are controlled by the United Nations. Nazidom will then have to rely on its stockpiles. No other source is available. And sulfur is an absolute essential in modern mechanized war.

Sulfur and its compounds have a thousand war-manufacturing uses. Most of it is consumed as sulfuric acid. Metal manufacturing industries use thousands of tons annually. It plays its part in the making of bullets, bombs and torpedoes. It is essential in the production of important explosives. Nitrated celluloses, used for many different purposes from smokeless powder to plastics, are produced by its use. Superphosphate fertilizer to increase the food supply is made with it from natural phosphates. Pure sulfur is used in rubber vulcanizing and in insecticides and fungicides. It has many other uses.

Nearly one-half of the sulfur used in the United States is consumed in making chemicals, including sulfuric acid and explosives. One-fourth is used in fertilizers, insecticides and fungicides. The pulp and paper industries consume nearly as much. Paint and varnish manufacturers, makers of dyes and coal-tar products, and the rubber industries are the other large consumers.

The biggest user of sulfuric acid is the fertilizer business. Chemical and explosive manufacturing is second. Petroleum refining consumes about one-

eighth of the available acid, and the iron and steel industries an equal amount.

The Italian production of sulfur three years ago was nearly 500,000 tons. The production since then is not known. In the same year considerably over 2,000,000 tons were produced in the United States. Now the American production is well over 3,000,000 tons a year. Most of it is obtained in Louisiana and Texas. In addition over 600,000 tons of iron, copper and zinc pyrites were produced, from which large quantities of sulfuric acid and free sulfur were obtained.

Hitler will be unable to secure sulfur from any other country in quantities great enough to be of any appreciable value. Spain produces about 25,000 tons a year, Turkey one-eighth of that amount. Japan mines enough for its own use, about 150,000 to 200,000 tons a year in pre-war days. She has none to spare for her fellow barbarians, and could not get it to them in any case. The amount produced in the rest of the world is very slight. Germany can secure a limited amount of pyrites from Axis-controlled countries, but in far less quantities than needed at the present war-spurred pace of consumption.

Science News Letter, June 5, 1943

MEDICINE

Night Blindness Due To Bright Tropical Sun

► SHIP collisions and disasters in the air may be caused by the tropical sun

which blinds men not only in the daylight but after dark as well.

A new warning of this danger to our fighting forces is issued by Commander James L. McCartney, Medical Corps, U. S. Naval Reserve, in *War Medicine*.

Sunlight, he points out, may irreversibly damage the retina, the light-sensitive structures and nerve cells lining the back of the eyeball which correspond to the film of a camera. Overstimulation of the eye by bright light for any length of time may cause night blindness.

The special danger, Commander McCartney warns, is that men afflicted with night blindness may see perfectly well during the day and not know that they cannot see as well at night.

"On a number of occasions," he reports, "tragic collisions have resulted because the navigation officer on the bridge was night blind, while he could see perfectly well during the daytime."

"A naval officer who had been overexposed to tropical sunlight did not realize that he had become night blind and as a result directed his ship into three collisions before his disability was discovered."

Night flying, night watch and night sentry duty for persons with night blindness are "out of the question," Commander McCartney declares.

Nystagmus and corneal astigmatism are two other eye disorders which frequently result from continued exposure to intense light. Nystagmus is a condition in which the eyeball involuntarily moves up and down, from side to side, or round and round. Corneal astigmatism is a condition of irregular curvature or refracting power of the transparent structure forming the outer layer of the front part of the eyeball.

Science News Letter, June 5, 1943

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• New Machines and Gadgets •

☼ **SHINY METAL** cylinders were found by the Marines on Guadalcanal. Cautious inspection proved them to be water filters, but quite different from our own rapid sand filters. Pressure forces water through porous clay to clarify it and apparently makes it pure enough for Jap consumption.

Science News Letter, June 5, 1943

☼ **SUPPLEMENTARY** gasoline tanks for aircraft, which can be dropped when the contents are used, are now made of laminated wood in the shape of an elongated egg. Baffles to prevent sloshing of the fuel strengthen the tanks. The inside is given a special coating to withstand the chemical reactions of high-test gasoline.

Science News Letter, June 5, 1943

☼ **A PLASTIC** flashlight strong enough to be used as a club will operate under water and at temperatures from 40 degrees below zero to 175 degrees above. The bottom is a cup to hold an extra bulb.

Science News Letter, June 5, 1943

☼ **THE CHANNEL-TREAD** tire shown in the picture has recently been developed for planes. Greater safety and heavier loads are possible in sand and soft landing surfaces of all kinds. Higher, stiffer sidewalls give greater area of contact with the ground.

Science News Letter, June 5, 1943



☼ **A NEW** roller-coating device has been developed to apply resin-oil emulsion wall paints. It consists of a wood roller covered with a resilient cushion to hold the paint.

Science News Letter, June 5, 1943

☼ **TAMDEN CONTROLS** for as many as a dozen electric circuits are now provided on a single shaft. The new device is designed particularly for certain radio and electronic needs. Control sections for individual circuits are fitted to nest compactly on the shaft.

Science News Letter, June 5, 1943

☼ **FLOOR WAX**, claimed to be self-polishing, slip-retardant, and water-resistant, is now available. It is not self-spreading, but is easily applied with a mop or cloth and dries in 20 minutes. It contains a high percentage of Car-nauba wax in a special emulsifying agent.

Science News Letter, June 5, 1943

☼ **PLASTIC SHOE TREES**, foot-shaped, light and durable, are claimed to hold shoes in shape without flattening out the soles. They are ventilated so that air circulates within the shoes, preventing moisture from being absorbed by the leather.

Science News Letter, June 5, 1943

If you want more information on the new things described here, send a three-cent stamp to **SCIENCE NEWS LETTER**, 1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 159.

MEDICINE

Man With Soldier's Heart Discharged for Second Time

➤ **THE UNIQUE** case of a man being discharged from the same army in two wars for the same physical disability, neurocirculatory asthenia, is reported by Major Louis F. Bishop, Jr., and Lieut. Robert W. Kimbro, Medical Corps, Army of the United States (*Journal, American Medical Association*, May 8).

Known also as soldier's heart, neurocirculatory asthenia is characterized by such symptoms as giddiness, shortness of breath and pain in the heart. It may be difficult to detect in the routine examination of candidates for induction into the Army, Major Bishop and Lieut. Kimbro point out. It is not until the physical and emotional strain of war makes itself felt that the person with this condition becomes incapacitated.

Discharged from the U. S. Army in 1918 with a certificate of disability and a diagnosis of neurocirculatory asthenia, the patient took up farming and got along fairly well. But his condition did not change, and soon after being inducted into the Army in 1942 he developed the same symptoms of pain in the heart, shortness of breath and the like that he had had in the last war, which led to his second discharge.

Science News Letter, June 5, 1943

MEDICINE

Sigma Delta Epsilon Gives Fellowship Award

➤ **THE NATIONAL** organization of women in scientific research, Sigma Delta Epsilon, has just selected Dorothy Marie Ziegler of St. Louis to receive their fellowship award of \$1,000.

Miss Ziegler will use the award to further her research at the Barnard Free Skin and Cancer Hospital in St. Louis, under the direction of Dr. Edmund V. Cowdry. New techniques are being used to study changes in the top skin layer comparing the harmless and malignant cells.

Science News Letter, June 5, 1943

In one book — the story of the year's outstanding scientific discoveries!

HERE are 28 pioneering scientific articles from leading magazines, covering such subjects as sulfa drugs; a new youth-retaining vitamin; torpedo planes; a new synthetic variety of dogs; etc. The second in a series of Mr. Ratcliff's Science Year Books. Order your copy now! \$2.50 at your bookseller's or direct from Doubleday, Doran and Co., Dept. 1165, Garden City, N. Y.



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Gentlemen: Enclosed find \$_____ for which please send me _____ copies of the Science Year Book of 1943, by John D. Ratcliff.

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First Glances at New Books

► WE ARE REMINDED that the powerful Army Air Forces, now playing such an important part in the defeat of our enemies, had its early beginning within the memory of many of us by the appearance of a new book of historic significance, *How Our Army Grew Wings* (Ronald, \$3.75). One of the authors, Brigadier General Frank P. Lahm, was himself the Army's first airplane pilot, and also the Army's first airship pilot. He prepared the book with the aid of notes, correspondence and manuscripts of the late Col. Charles deForest Chandler who was the first to fire a machine gun from an airplane in flight. It was Col. Chandler's wish to

leave this book as a legacy for future officers of the Air Corps—a legacy they and many others will treasure.

Science News Letter, June 5, 1943

► RECENT economic developments in a great nation are ably discussed in *Brazil in the Making*, by Jose Jobim (Macmillan, \$3.50). The author, one of that country's leading economists, gives facts and figures that reveal agricultural, mineral and industrial possibilities.

Science News Letter, June 5, 1943

► AMERICAN HISTORY from a geographical viewpoint is narrated in *Years of This Land: A Geographical History of the United States*, by Her-

mann R. Muelder and David M. DeLo (*Appleton-Century*, \$2.50). This new presentation of the story of our country will make interesting reading for conservation minded persons who should know that "realistic planning for the future can come only from knowledge of the past."

Science News Letter, June 5, 1943

► GARDENERS who own a rock garden or wall garden will find *Alpines in Colour and Cultivation*, by T. C. Mansfield, (*Dutton*, \$3.75) helpful and interesting. Plants are described alphabetically and fully and the colored illustrations are conducive to planting.

Science News Letter, June 5, 1943

Just Off the Press

AN AERONAUTICAL REFERENCE LIBRARY: A Selected List of Technical Books Essential to Aeronautical Library—Willard Kelso Dennis, comp.—*Special Libraries Assoc.*, 31 p., \$1.

AIRCRAFT HYDRAULICS—Harold W. Adams—*McGraw-Hill*, 159 p., illus., \$1.75. By the assistant chief designer of Douglas Aircraft Company.

THE AMAZON: The Life History of a Mighty River—Caryl P. Haskins—*Doubleday, Doran*, 415 p., illus., \$4.

ARCHEOLOGICAL STUDIES IN PERU, 1941-1942—W. Duncan Strong—*Columbia Univ. Press*, 224 p., illus., \$3.75.

BOUNTY OF THE WAYSIDE—Walter Beebe Wilder—*Doubleday, Doran*, 256 p., illus., \$2.50. Includes recipes whose ingredients may be found by the wayside.

BRITANNICA BOOK OF THE YEAR, 1943—*Encyclopaedia Britannica*, 812 p., illus., \$10.

A COMPREHENSIVE SMALL ARMS MANUAL—Charles F. Haven—*Morrow*, 159 p., illus., \$1.50.

ECUADOR: Portrait of a People—Albert B. Franklin—*Doubleday, Doran*, 326 p., illus., \$3.50.

ENGINE DESIGN AS RELATED TO AIRPLANE POWER—*General Motors*, 80 p., illus. Free upon direct application to General Motors Corp., Detroit, Mich. Paper. Originally intended for General Motors employees but now available for limited distribution to the public.

FIRST PRINCIPLES OF RADIO COMMUNICATIONS—Alfred Morgan—*Appleton-Century*, 366 p., illus., \$3.

FUNDAMENTAL JOBS IN ELECTRICITY—Edgar Cloud Perry & Harry V. Schaebook—*McGraw-Hill*, 447 p., illus., \$2.20.

GEOLOGY AND GROUND-WATER RESOURCES OF FORD COUNTY, KANSAS—Herbert A. Waite—*Univ. of Kansas*, 250 p., illus., maps, 25c. (State Geological Survey of Kansas, Bulletin 43).

GEOLOGY AND GROUND-WATER RESOURCES OF MEADE COUNTY, KANSAS—John C. Frye—*Univ. of Kansas*, 152 p., illus., maps, 25c. (State Geological Survey of Kansas, Bulletin 45).

GEOPHYSICAL INVESTIGATIONS IN THE TRI-STATE ZINC AND LEAD MINING DISTRICT—J. J. Jakosky, R. M. Dreyer and C. H. Wilson—*Univ. of Kansas*, 151 p., illus., 25c. (State Geological Survey of Kansas, Bulletin 44, also published as Bulletin 24, Engineering Experiment Station).

THE GOEBBELS EXPERIMENT: A Study of the Nazi Propaganda Machine—Derrick Sington and Arthur Weidenfeld—*Yale Univ. Press*, 274 p., illus., \$3.

HEALTH PRACTICE INVENTORY AND MANUAL—Ned. B. Jones—*Stanford Univ. Press*, 4 p., 25 tests, \$1.25; 100 tests, \$3.50; 500 tests, \$15; 1,000 tests or more, per hundred, \$2.50.

HE'S IN THE PARATROOPS NOW—A. D. Rathbone IV—*McBride*, 190 p., illus., \$2.50.

HOW OUR ARMY GREW WINGS: Airmen and Aircraft Before 1914—Charles deForest Chandler and Frank P. Lahm—*Ronald Press Co.*, 333 p., illus., \$3.75.

LUTHER BURBANK: PLANT MAGICIAN—John Y. Beatty—*Messner*, 251 p., illus., \$2.50. For young people.

NAVAL ARCHITECTURE AS ART AND SCIENCE—C. O. Liljgren—*Cornell Maritime Press*, 212 p., illus., maps, \$4.

NUTRITION AND DIET IN HEALTH AND DISEASE—James S. McLester—*Saunders*, 849 p., \$8. Fourth edition.

THE OLD DIRT DOBBER'S GARDEN BOOK—Thomas A. Williams—*McBride*, 246 p., illus., \$2.75.

OLD NAMELESS: The Epic of a U. S. Battlewagon—Sidney Shalett—*Appleton-Century*, 177 p., \$2.

THE PINE TREE SHIELD: A Novel Based on the Life of a Forester—Elizabeth Canfield Flint—*Doubleday, Doran*, 251 p., \$2.50.

POSTWAR PLANNING IN THE UNITED STATES: An Organization Directory 2—*Twentieth Cent. Fund*, 101 p., \$1.

A PRACTICAL GUIDE TO SUCCESSFUL FARMING—Wallace S. Moreland, ed. *Halycon*, 1001 p., illus., \$3.95.

PRINCIPLES OF AERONAUTICAL RADIO ENGINEERING—P. C. Sandretto—*McGraw-Hill*, 413 p., \$3.50. Textbook for persons with preliminary knowledge of radio.

PUBLIC WORKS ENGINEERS' YEARBOOK 1943—*American Public Works Assoc.*, 333 p., \$3.75. Includes Proceedings of the 1942 Public Works Congress, held at Cleveland, Ohio, Oct. 18-21, 1942.

QUESTIONS AND ANSWERS FOR MARINE ENGINEERS—Capt. H. C. Dinger, comp.—*Simmons-Boardman Publ. Co.*, 159 p., illus., \$1 (paper).

RELATIVITY AND ITS ASTRONOMICAL IMPLICATIONS—Philipp Frank—*Sky Publishing Corp.*, 23 p., illus., 50c. Paper. "The significance of general relativity presented in the language of the layman."

A SENSE OF HUMUS—Bertha Damon—*Simon and Schuster*, 250 p., illus., \$2.50.

A SOCIAL PSYCHOLOGY OF WAR AND PEACE—Mark A. May—*Yale Univ. Press*, 284 p., \$2.75.

WARTIME FACTS AND POSTWAR PROBLEMS: A Study and Discussion Manual—Evans Clark, ed.—*Twentieth Century Fund*, 136 p., 50c.

WILLIAM MCDUGALL: A Bibliography Together With a Brief Outline of His Life—A. M. Lewin Robinson—*Duke Univ. Press*, 54 p., \$1.50. Writings of a famous psychologist.

YEARS OF THIS LAND: A Geographical History of the U. S.—Hermann R. Muelder and David M. DeLo—*Appleton-Century*, 243 p., illus., \$2.50.

YOUR ARTHRITIS: What You Can Do About It—Alfred E. Phelps—*Morrow*—192 p., illus., \$2.

Science News Letter, June 5, 1943